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(56) Documents cited
GB 1531480 GB 0962570 GB 0598652
GB 1508837

(58) Field of search

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G5C

(54) Printed articles

(57) A printed article comprises a layer 11 of a glow material such as a natural or synthetic phosphorescent or fluorescent material or a reflective microbead material together with a translucent pigment material which may be incorporated in the layer (Fig. 1) or in a separate overlayer 15. The glow layer may be printed in a selected pattern, or applied as an overall uniform layer and overprinted with a non-glow or contrast material 14. Articles such as advertising or warning signs, decorative panels and even T-shirts and other clothing can be printed and will display different colour effects under different levels of illumination.

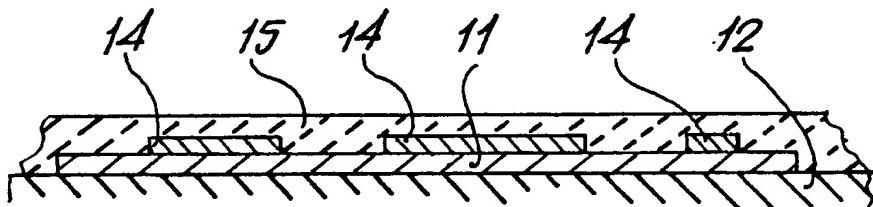


FIG.2

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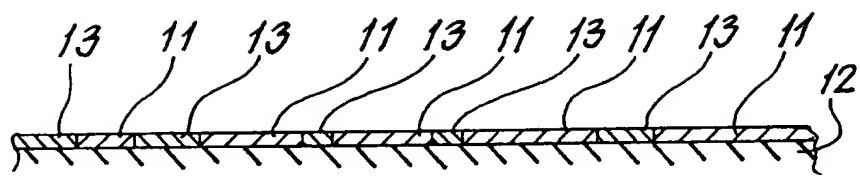


FIG.1

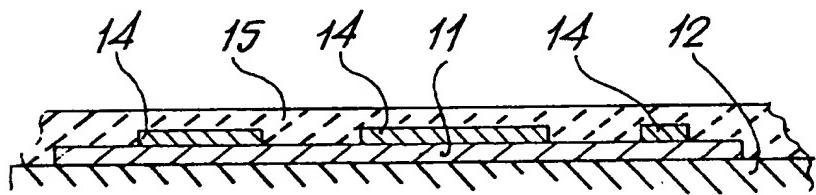


FIG.2

SPECIFICATION**Printed articles**

- 5 This invention relates to printed articles and particularly to the use of glow materials. A glow material is defined herein as a material which glows or appears to glow as a result of illumination and the term includes natural and
 10 synthetic phosphorescent and fluorescent materials which emit light after and/or during illumination as well as glass or other microbeads which by virtue of total internal reflection of incident light back towards the light
 15 source appear, when viewed from the light source, brighter than they should.

Such materials are particularly effective in conditions of low illumination levels and are used for example to render visible in the dark
 20 the hands of watches and clocks and to enhance the visibility of road signs at night. Under ordinary or daytime illumination, however, the materials are undistinguished.

The present invention provides printed articles which are distinctive both under low and ordinary or daylight illumination.

The invention comprises a printed article comprising a layer of a glow material as herein defined and translucent material effecting the normal colouring of the article.

The glow material whether of phosphorescent or fluorescent or reflective microbead material, may be printed on to a light coloured, preferably white backing. If a dark
 35 backing is used, it may sometimes be desirable to pre-print a white or light colour beneath the glow areas. The glow material may be printed on to selected areas of the article while areas not so printed are printed with a
 40 different material, which may be non-glow or dark coloured for contrast. The glow material may, however, be applied over a solid area of the article and selected areas overprinted with such a different material.

45 The said translucent material may comprise translucent pigment incorporated in an ink with the glow material, or it may be applied in a separate layer over the glow material.

It has been found, surprisingly, that a translucent colouring material does not significantly affect the night-time colour value of some glow materials, but it does, of course, affect the intensity of the emitted or reflected light according to the density and opacity of
 55 the material.

The "glow" appearance of the article can, on that account, be made quite different from the normal or daylight appearance. Difference areas of glow material can be coloured with
 60 different colours of translucent material, and translucent material can of course be applied to regions lacking glow material.

The invention also comprises a method for making a printed article comprising the steps
 65 of applying a layer of glow material as herein

defined and translucent material effecting the normal colouring of the article.

The glow material and the translucent material can be applied separately or mixed together in an ink.

Printing can be effected by a screen technique—some glow materials, especially reflective microbeads, comprise relatively large particles in suspension, and a sufficiently coarse mesh screen must be used.

Printed articles, and methods for making them according to the invention will now be described with reference to the accompanying drawings in which:

80 *Figure 1* is a cross-section through a printed surface of a first embodiment and

Figure 2 is a cross-section, like *Fig. 1* of a second embodiment.

The drawings illustrate printed articles comprising a layer 11 of glow material which might be a fluorescent or a phosphorescent material or a reflective microbead material or indeed a combination of two or all three of such materials, and translucent material effecting the normal colouring of the article. The layer 11 is applied to a light-coloured or white backing 12.

In *Fig. 1*, the layer 11 is printed on to the light coloured backing in selected areas, corresponding to the desired appearance or pattern or device or message to be apparent as a result of the glow material. The glow material will be made up from a natural or synthetic luminous pigment which may be supplied in powder or liquid form, or from microbeads and an appropriate suspension fluid such as p.v.c./vinyl lacquer or varnish or clear ink for vinyl printing, together with suitable retarding agents and any other additives ordinarily used in screen printing.

The ink also contains additional translucent pigments, in one method, which can be mixed in to match a regular ink that may be used on other parts of the article. Areas not covered by the ink can then be printed with other, conventional inks which appear in *Fig. 1* as layer 13. Such areas may be printed in a dark colour to assist night-time contrast.

In *Fig. 2*, the glow material layer 11 extends over the whole area of the backing 12, or at least as a solid coat over an area in which glow effects are required and this is then overprinted. A layer 14 of opaque, non-glow material is then printed over the glow material layer 11 to leave exposed areas

120 thereof in any desired appearance or pattern or device or message. The glow material may or may not contain a translucent pigment effecting normal colouring, but such pigment can then be applied in a separate layer 15 as normal, if desired multicolour printing to give any desired appearance or a pattern or device or message different from that exposed of the layer 11.

130 Any printable article may be printed in this

way such as a sign or hazard warning, or a reflective panel or mudflap for a motor vehicle or even a motor-cyclist's jacket, estate agents and other "For Sale" signs, advertising hoardings (avoiding the need for expensive artificial illumination at night), decorative and/or safety panels for domestic or commercial use, which can blend in with their surroundings during well-lit conditions, and even other articles of clothing such as T-shirts that carry advertising or promotional slogans.

The extent, if any, to which the translucent colouring material will affect the night-time colour value of a phosphorescent or fluorescent material will depend on the emission characteristics of the phosphorescent or fluorescent material and the absorption characteristics of the translucent colouring material. A phosphorescent green combined with a translucent blue pigment will still appear green in low illumination conditions. There is not, of course, much point in using a pigment that is not translucent to at least some wave length emitted by the phosphorescent material.

25 CLAIMS

1. A printed article comprising a layer of a glow material as herein defined and translucent material effecting the normal colouring of the article.
2. A printed article according to claim 1, in which the glow material comprises a phosphorescent material.
3. A printed article according to claim 1 or 35 claim 2, in which the glow material comprises a fluorescent material.
4. A printed article according to claim 1 or claim 2 or claim 3, in which the glow material comprises reflective microbeads.
- 40 5. A printed article according to any one of claims 1 to 4, in which the glow material is printed on to a light-coloured backing.
6. A printed article according to any one of claims 1 to 5, in which the glow material is 45 printed on to selected areas of the article and areas not so printed are printed with a different material.
7. A printed article according to claim 6, in which said different material is a non-glow 50 material.
8. A printed article according to claim 6 or claim 7, in which said different material is dark-coloured.
9. A printed article according to any one 55 of claims 1 to 5, in which the glow material is applied over a solid area of the article and selected areas overprinted with a different material.
10. A printed article according to claim 9, 60 in which said different material is a non-glow material.
11. A printed article according to claim 9 or claim 10, in which said different material is dark coloured.
- 65 12. A printed article according to any one

of claims 1 to 11, in which said translucent material comprises translucent pigment incorporated in an ink with the glow material.

70 13. A printed article according to any one of claims 1 to 12, in which said translucent material is applied in a separate layer over the glow material.

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